<u>AMENDMENTS TO THE CLAIMS</u>

This listing of claims replaces all prior versions, and listings, of claims in the application:

<u>Listing of Claims:</u>

1.   (Currently Amended) In a system where an incoming video stream has a bit rate, a method for transcoding the incoming video stream to reduce the bit rate of the video stream, the method comprising:

decoding an incoming video stream that includes at least one B frame <u>and a plurality of macroblocks, each macroblock having parameters that include at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors</u>, wherein <u>the</u> parameters of the incoming video stream are extracted from the incoming video stream and used in generating a new video stream;

spatially reducing a size of images of the incoming video stream horizontally and vertically by a selected factor, and such that the at least one B frame is considered during the spatially reducing images;

<u>mapping each of the plurality of macroblocks to at least one macroblock in the new video stream;</u>

<u>determining a macroblock type for each macroblock of the new video stream, wherein the macroblock type is determined by applying a weighted mean rounded value determined from the type flags of only the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and</u>

generating a <u>the</u> new video stream that includes spatially reduced images using one or more of the parameters extracted from the incoming video stream, <u>and at least the macroblock type of macroblocks of the new video stream,</u> wherein at least one of the parameters corresponds to the at least one B frame, wherein less than all of the parameters of the incoming video stream are re-computed for the new video stream, and wherein the spatially reduced images in the new video stream include at least one B frame.

2.   (Original) A method as defined in claim 1, wherein spatially reducing images of the incoming video stream by a selected factor further comprises re-sampling the incoming video stream after it has been decoded.

3.   (Original) A method as defined in claim 1, wherein generating a new video stream further comprises at least one of:

scaling f_codes of the incoming video stream as the f_codes is decoded; and

scaling f_codes of the incoming video stream after decoding an entire picture of the video stream.

4.   (Cancelled).

5.   (Currently Amended) A method as defined in ~~claim 4~~ claim 1, wherein determining a macroblock type for each macroblock comprises:

determining a macroblock type for each macroblock of the incoming video stream that maps to a particular macroblock of the new video stream, wherein the macroblock type of the macroblocks from the incoming video stream are included in the parameters of the incoming video stream;

determining that at least one macroblock of the incoming video stream maps to each of a plurality of macroblocks of the new video stream;

weighting each macroblock type of the macroblocks in the incoming video stream according to their contribution to the particular macroblock of the new video stream;

taking a mean of the weighted macroblock types from the incoming video stream; and

rounding the mean, wherein the rounded mean determines the macroblock type for the particular macroblock of the new video stream.

6.   (Original) A method as defined in claim 5, further comprising determining other flags associated with the macroblock type.

7.   (Original) A method as defined in claim 6, wherein the flags comprise a quant flag, a forward flag, a backward flag, and a pattern flag.

8.   (Original) A method as defined in claim 1, wherein generating a new video stream further comprises selecting motion vectors for each picture that requires motion vectors.

9.   (Original) A method as defined in claim 8, wherein selecting motion vectors further comprises determining a value of the motion vectors from motion vectors of the incoming video stream.

10.   (Original) A method as defined in claim 9, wherein determining a value of the motion vectors from motion vectors of the incoming video stream further comprises determining a weighted mean scaled value of the motion vectors from motion vectors of the incoming video stream that map to a particular macroblock of the new video stream.

11.   (Original) A method as defined in claim 8, wherein selecting motion vectors further comprises:

selecting candidate motion vectors for a particular macroblock of the new video stream, wherein the candidate motion vectors comprise scaled motion vectors from the incoming video stream and a weighted mean scaled vector; and

determining a best motion vector from the candidate motion vectors, wherein the best motion vector provides a best fit to the data.

12.   (Original) A method as defined in claim 8, further comprising performing fine grain motion estimation for the motion vectors.

13.   (Original) A method as defined in claim 8, wherein selecting motion vectors comprises one or more of:

selecting weighted mean scaled motion vectors;

selecting scaled motion vectors of the incoming video stream; and

selecting field vectors.

14.   (Original) A method as defined in claim 1, wherein generating a new video stream further comprises determining flags of the new video stream from flags of the incoming video stream.

15.   (Original) A method as defined in claim 14, wherein determining flags of the new video stream from flags of the incoming video stream further comprises determining a DCT type flag using a weighted mean rounded procedure.

16.   (Original) A method as defined in claim 1, wherein generating a new video stream further comprises determining a quantizer scale of the new video stream using a quantizer scale of the incoming video stream.

17.   (Original) A method as defined in claim 16, wherein determining a quantizer scale of the new video stream using a quantizer scale of the incoming video stream further comprises determining a quantizer scale using one of:

> a weighted mean rounded procedure;
>
> a weighted max rounded procedure;
>
> a weighted min rounded procedure; and
>
> a weighted median rounded procedure.

18.   (Original) A method as defined in claim 1, further comprising determining a coded block pattern.

19.   (Currently Amended) A method for transcoding an original video stream using stream parameters that are included in the original stream video stream such that the bit rate of the original video stream is reduced, the method comprising:

decoding the original video stream, which includes at least one B frame and a plurality of macroblocks, each macroblock having parameters that include at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors;

re-sampling the decoded original video stream in order to spatially reduce a size of images of the original video stream horizontally and vertically by a factor, and such that the at least one B frame is considered during re-sampling;

mapping each of the plurality of macroblocks to at least one macroblock in a new video stream;

determining new stream parameters for a the new video stream, wherein the new stream parameters are determined from the stream parameters of the original video stream, wherein at least one of the stream parameters of the original video stream corresponds to the at least one B frame, wherein only some of the original stream parameters are re-computed, and wherein some of the new stream parameters are equal to some of the stream parameters of the original video stream, and wherein determining new stream parameters includes determining a macroblock type for each macroblock of the new video stream, wherein the macroblock type is determined by applying a weighted mean rounded value determined from the type flags of the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and

generating the new video stream that includes the spatially reduced images using the new stream parameters, wherein the spatially reduced images in the new video stream include at least one B frame.

20.   (Original) A method as defined in claim 19, wherein generating the new video stream comprises at least one of:

scaling f_codes of the original video stream as the f_codes are decoded; and

scaling f_codes of the original video stream after decoding an entire picture of the original video stream.

21.   (Original) A method as defined in claim 19, wherein generating the new video stream further comprises determining flags for the new video stream using flags of the original video stream.

22.   (Cancelled).

23.   (Currently Amended) A method as defined in ~~claim 22~~ claim 19, wherein determining a macroblock type for each macroblock of the new video stream comprises:

determining a macroblock type for each macroblock of the original video stream that maps to a particular macroblock of the new video stream, wherein the macroblock type of the macroblocks from the original video stream are retrieved from the stream parameters of the original video stream;

determining that at least one macroblock of the incoming video stream maps to each of a plurality of macroblocks of the new video stream;

determining a weighted mean rounded value for the macroblock type of the macroblocks of the original video stream that map to the particular macroblock; and

assigning the weighted mean rounded value as the macroblock type of the particular macroblock.

24.   (Original) A method as defined in claim 23, further comprising determining other flags associated with the particular macroblock.

25.   (Original) A method as defined in claim 24, wherein the flags comprise a quant flag, a forward flag, a backward flag, and a pattern flag.

26.   (Original) A method as defined in claim 19, wherein generating a new video stream comprises selecting motion vectors for each picture of the new video stream that requires motion vectors, wherein original motion vectors are included in the stream parameters of the original video stream.

27.   (Original) A method as defined in claim 26, wherein selecting motion vectors further comprises:

determining a weighted mean scaled value for motion vectors of macroblocks of the original video stream that map to a particular macroblock of the new video stream; and

assigning the weighted mean scaled value to motion vectors of the particular macroblock.

28.   (Original) A method as defined in claim 26, wherein selecting motion vectors further comprises:

selecting candidate motion vectors for a particular macroblock of the new video stream, wherein the candidate motion vectors comprise scaled motion vectors from the original video stream and weighted mean scaled motion vectors; and

determining a best motion vector from the candidate motion vectors, wherein the best motion vector provides a best fit to the data of the new video stream.

29.   (Original) A method as defined in claim 26, further comprising performing fine grain motion estimation for the motion vectors.

30.   (Original) A method as defined in claim 19, wherein generating the new video stream further comprises determining a DCT type flag for each macroblock using a weighted mean rounded procedure.

31.   (Original) A method as defined in claim 19, wherein generating the new video stream further comprises determining a quantizer scale using one of:

a weighted mean rounded procedure;

a weighted max rounded procedure;

a weighted min rounded procedure; and

a weighted median rounded procedure.

32.   (Original) A method as defined in claim 19, further comprising determining a coded block pattern for each macroblock.

33.   (Currently Amended) In a system wherein an incoming video stream has a bit rate, a method for transcoding the incoming video to reduce the bit rate of the incoming video stream by using stream parameters of the incoming video stream, the method comprising:

decoding the incoming video stream, which includes at least one B frame and a plurality of macroblocks, each macroblock having parameters that include at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors, and wherein stream parameters of the decoded video stream are used in generating a new video stream;

spatially reducing a size of images of the incoming video stream horizontally and vertically by subsampling the incoming video stream, and such that the at least one B frame is considered during the spatially reducing;

mapping each of the plurality of macroblocks to at least one macroblock in a new video stream;

generating new motion vectors for each macroblock of the new video stream that requires motion vectors using motion vectors from the incoming video stream;

determining a macroblock type for each macroblock of the new video stream, wherein the macroblock type is a weighted mean rounded value determined from macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and

generating the new video stream using the new motion vectors, the new macroblock types, the stream parameters, and the reduced images, wherein at least one of the stream parameters corresponds to the at least one B frame, wherein some of the stream parameters from the incoming video stream that are included in the new video stream are unchanged in the new video stream, and wherein the spatially reduced images in the new video stream include at least one B frame.

34.   (Original) A method as defined in claim 33, wherein generating new motion vectors for each macroblock of the new video stream that requires motion vectors further comprises determining a weighted mean scaled value from the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream.

35.   (Original) A method as defined in claim 33, wherein generating new motion vectors for each macroblock of the new video stream that requires motion vectors further comprises determining a motion vector that provides a best fit to the data of the new video stream from candidate vectors, wherein the candidate vectors comprise scaled motion vectors from the incoming video stream and a weighted mean scaled vector derived from the scaled motion vectors.

36.   (Original) A method as defined in claim 35, further comprising performing fine grain motion estimation for the motion vectors.

37.   (Original) A method as defined in claim 33, wherein generating the new video stream further comprises determining a DCT type flag, a quantizer scale, and a coded block pattern for the new video stream.

38.   (Original) A method as defined in claim 33, further comprising at least one of:
        scaling f_codes of the original video stream as the f_codes are decoded; and
        scaling f_codes of the original video stream after decoding an entire picture of the original video stream.

39.   (Currently Amended) A physical computer ~~program product~~ readable storage medium storing computer-executable instructions for implementing a method for transcoding an original video stream using stream parameters that are included in the original stream video stream such that the bit rate of the original video stream is reduced, the computer program product comprising:

~~a computer readable medium having computer executable instructions for performing the method, the method comprising:~~

decoding the original video stream, which includes at least one B frame and a plurality of macroblocks, each macroblock having parameters that include at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors;

re-sampling the decoded original video stream in order to spatially reduce a size of images of the original video stream horizontally and vertically by a factor, and such that the at least one B frame is considered during the re-sampling;

mapping each of the plurality of macroblocks to at least one macroblock in a new video stream;

determining new stream parameters for ~~a~~ the new video stream, wherein the new stream parameters are determined from the stream parameters of the original video stream, wherein only some of the original stream parameters are re-computed, ~~and~~ wherein some of the new stream parameters are unchanged, and wherein determining new stream parameters includes determining a macroblock type for each macroblock of the new video stream, wherein the macroblock type is determined by applying a weighted mean rounded value determined from the type flags of the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and

generating the new video stream that includes the spatially reduced images using the new stream parameters, wherein the spatially reduced images in the new video stream include at least one B frame.

40.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 39, wherein generating the new video stream comprises at least one of:

scaling f_codes of the original video stream as the f_codes are decoded; and

scaling f_codes of the original video stream after decoding an entire picture of the original video stream.

41.   (Cancelled).

42.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in ~~claim 41~~ claim 39, wherein determining a macroblock type for each macroblock of the new video stream comprises:

> determining a macroblock type for each macroblock of the original video stream that maps to a particular macroblock of the new video stream from the stream parameters of the original video stream;

> determining that at least one macroblock of the incoming video stream maps to each of a plurality of macroblocks of the new video stream, such that the at least one macroblock only partially maps to any one macroblock of the new video stream and only contributes a partial value of its type flag to the weighted mean rounded value;

> determining a weighted mean rounded value for the macroblocks of the original video stream that map to the particular macroblock; and

> assigning the weighted mean rounded value as the macroblock type of the particular macroblock.

43.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 41, further comprising determining other flags associated with the particular macroblock.

44.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 43, wherein the flags comprise a quant flag, a forward flag, a backward flag, and a pattern flag.

45.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 39, wherein generating a new video stream comprises selecting motion vectors for each picture of the new video stream that requires motion vectors, wherein original motion vectors are included in the stream parameters.

46.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 45, wherein selecting motion vectors further comprises:

> determining a weighted mean scaled value for motion vectors of macroblocks of the original video stream that map to a particular macroblock of the new video stream; and

> assigning the weighted mean scaled value to motion vectors of the particular macroblock.

47.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 45, wherein selecting motion vectors further comprises:

selecting candidate motion vectors for a particular macroblock of the new video stream, wherein the candidate motion vectors comprise scaled motion vectors from the original video stream and weighted mean scaled motion vectors; and

determining a best motion vector from the candidate motion vectors, wherein the best motion vector provides a best fit to the data of the new video stream.

48.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 45, further comprising performing fine grain motion estimation for the motion vectors.

49.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 45, wherein generating the new video stream further comprises determining a DCT type flag for each macroblock using a weighted mean rounded procedure.

50.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 49, wherein generating the new video stream further comprises determining a quantizer scale using one of:

a weighted mean rounded procedure;

a weighted max rounded procedure;

a weighted min rounded procedure; and

a weighted median rounded procedure.

51.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 39, further comprising determining a coded block pattern for each macroblock.

52.   (Currently Amended) In a system wherein an incoming video stream has a bit rate, a physical computer ~~program product~~readable storage medium having computer executable instructions for implementing a method for transcoding the incoming video to reduce the bit rate of the incoming video stream by using stream parameters of the incoming video stream, the computer program product comprising:

~~a computer readable medium having computer executable instructions for performing the method, the method comprising:~~

decoding the incoming video stream, which includes at least one B frame and a plurality of macroblocks, each macroblock having parameters that include at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors, wherein stream parameters of the decoded video stream are used in generating a new video stream;

spatially reducing a size of images of the incoming video stream horizontally and vertically by subsampling the incoming video stream, and such that the at least one B frame is considered during the spatially reducing;

mapping each of the plurality of macroblocks to at least one macroblock in a new video stream;

generating new motion vectors for each macroblock of the new video stream that requires motion vectors using motion vectors from the incoming video stream;

determining a macroblock type for each macroblock of the new video stream, wherein the macroblock type is a weighted mean rounded value determined from macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and

generating the new video stream using the new motion vectors, the new macroblock types, and the reduced images, wherein other stream parameters from the incoming video stream are unchanged in the new video stream, wherein at least one of the other stream parameters corresponds to the at least one B frame, and wherein the spatially reduced images in the new video stream include at least one B frame.

53.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 52, wherein generating new motion vectors for each macroblock of the new video stream that requires motion vectors further comprises determining a weighted mean scaled value from the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream.

54.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 52, wherein generating new motion vectors for each macroblock of the new video stream that requires motion vectors further comprises determining a motion vector that provides a best fit to the data of the new video stream from candidate vectors, wherein the candidate vectors comprise scaled motion vectors from the incoming video stream and a weighted mean scaled vector derived from the scaled motion vectors.

55.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 54, further comprising performing fine grain motion estimation for the motion vectors.

56.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 52, wherein generating the new video stream further comprises determining a DCT type flag, a quantizer scale, and a coded block pattern for the new video stream.

57.   (Currently Amended) A computer ~~program product~~ readable storage medium as defined in claim 52, further comprising at least one of:

scaling f_codes of the original video stream as the f_codes are decoded; and

scaling f_codes of the original video stream after decoding an entire picture of the original video stream.

58.   (Currently Amended) A spatial transcoder for transcoding an incoming video stream in order to reduce a bit rate of the incoming video stream, the spatial transcoder comprising:

a stream decoder for decoding the incoming video stream, which includes at least one B frame and a plurality of macroblocks, and for extracting stream parameters from the incoming video stream, the stream parameters including, for each macroblock, at least a type flag indicating whether the macroblock is infra or non-infra and, for each non-infra macroblock, one or more motion vectors;

a resampler for spatially reducing a size of images of the incoming video stream horizontally and vertically, and such that the at least one B frame is considered during the spatially reducing, the resampler being further configured to map each of the plurality of macroblocks to at least one macroblock in a new video stream and determine a macroblock type for each macroblock of the new video stream, wherein the macroblock type is determined by applying a weighted mean rounded value determined from the type flags of the macroblocks of the incoming video stream that map to a particular macroblock of the new video stream; and

a stream generator for generating an output video stream that has a lower bit rate and a smaller image size than the incoming video stream, wherein the stream generator uses the stream parameters to generate new stream parameters for the output video stream using the original stream parameters and including at least one parameter corresponding to the at least one B frame, and wherein the output video stream includes at least one B frame.

59.   (Currently Amended) A spatial transcoder as defined in claim 58, wherein the stream parameters further comprise one or more of:

f_codes; motion vectors; macroblock type; motion type, motion vertical field select; forward prediction type; backward prediction type; DCT type; quantizer scale; coded block pattern; and DCT coefficients.

60.   (Previously Presented) A method as recited in claim 1, wherein generating a new video stream includes making available one or more reference images for the at least one B frame.

61.   (Currently Amended)   A method as recited in claim 1, wherein the selected factor reduces new video stream is output having a width of the images to bewhich is a factor multiple of sixteen, and reduces a height which is of the images to a factor multiple of thirty-two.